

(No Model.)

2 Sheets—Sheet 1.

P. SODAL.

FURNACE AND APPARATUS FOR BURNING BAGASSE.

No. 375,461.

Patented Dec. 27, 1887.

Fig. 1.

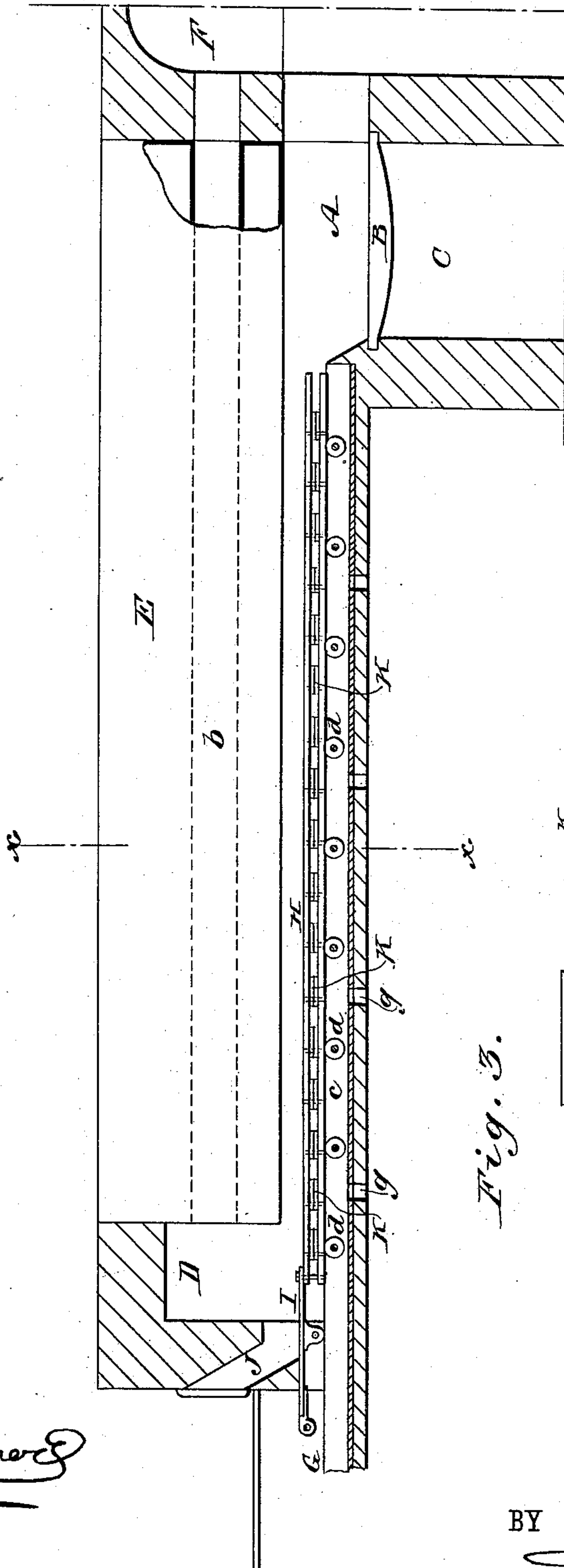
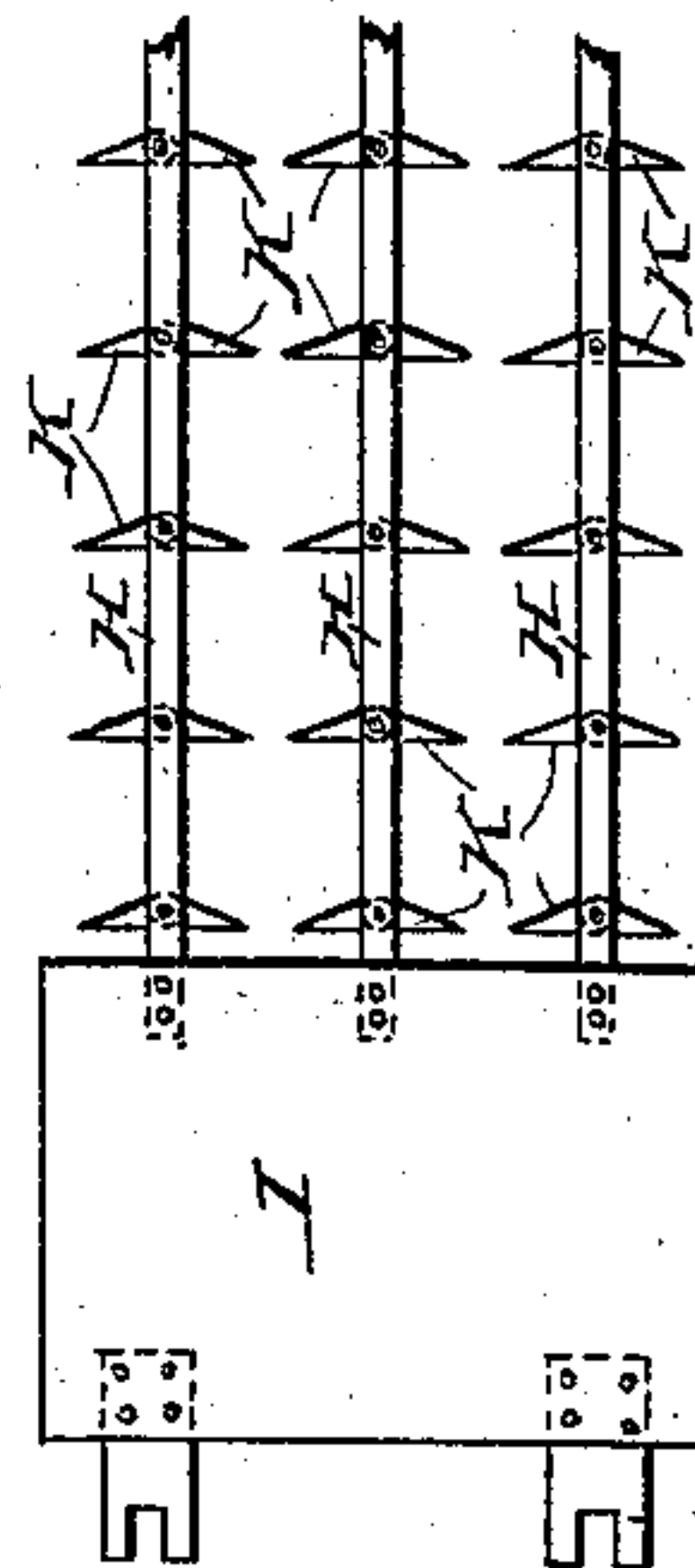


Fig. 3.



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(No Model.)

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Fig. 2.

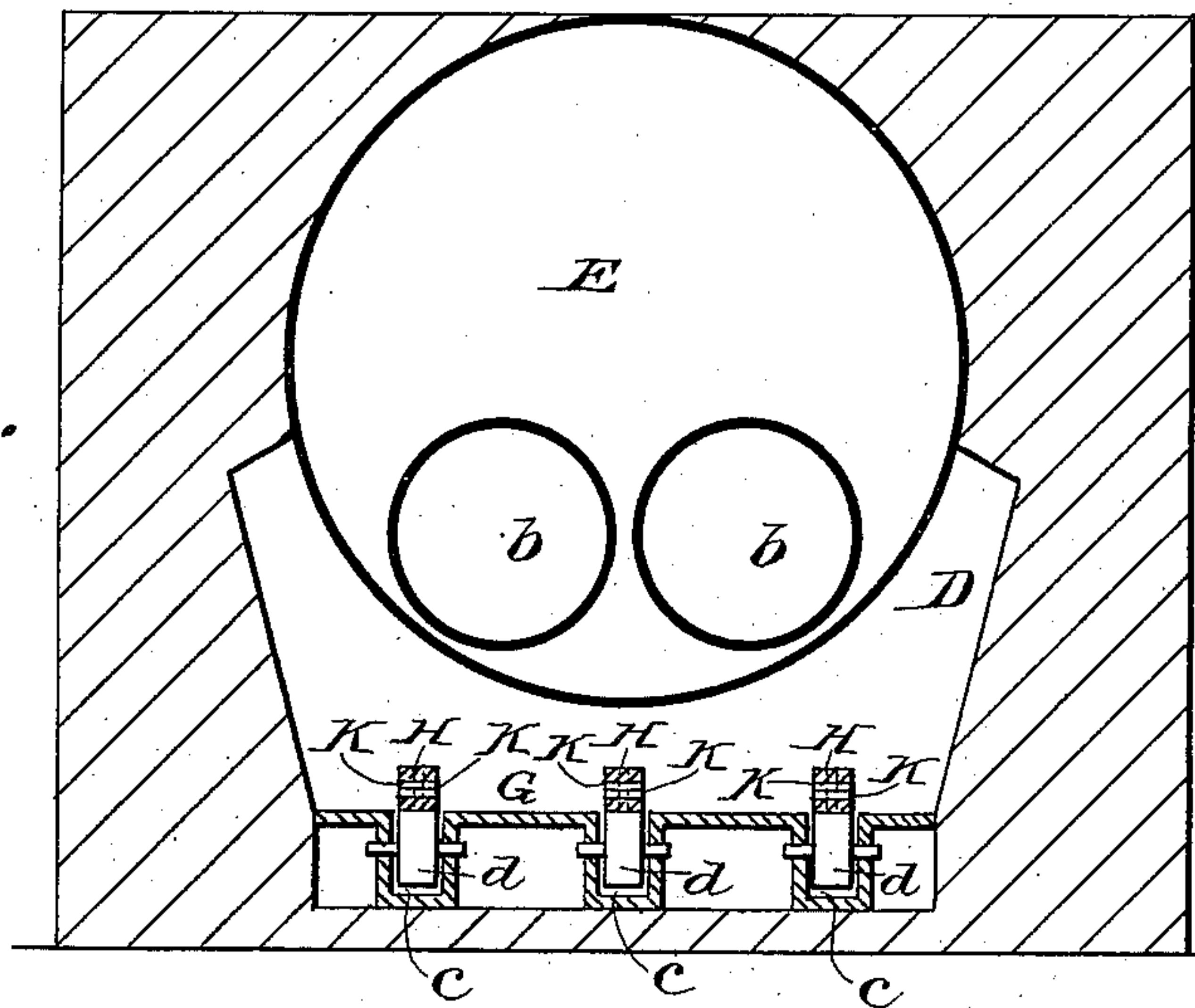


Fig. 4.

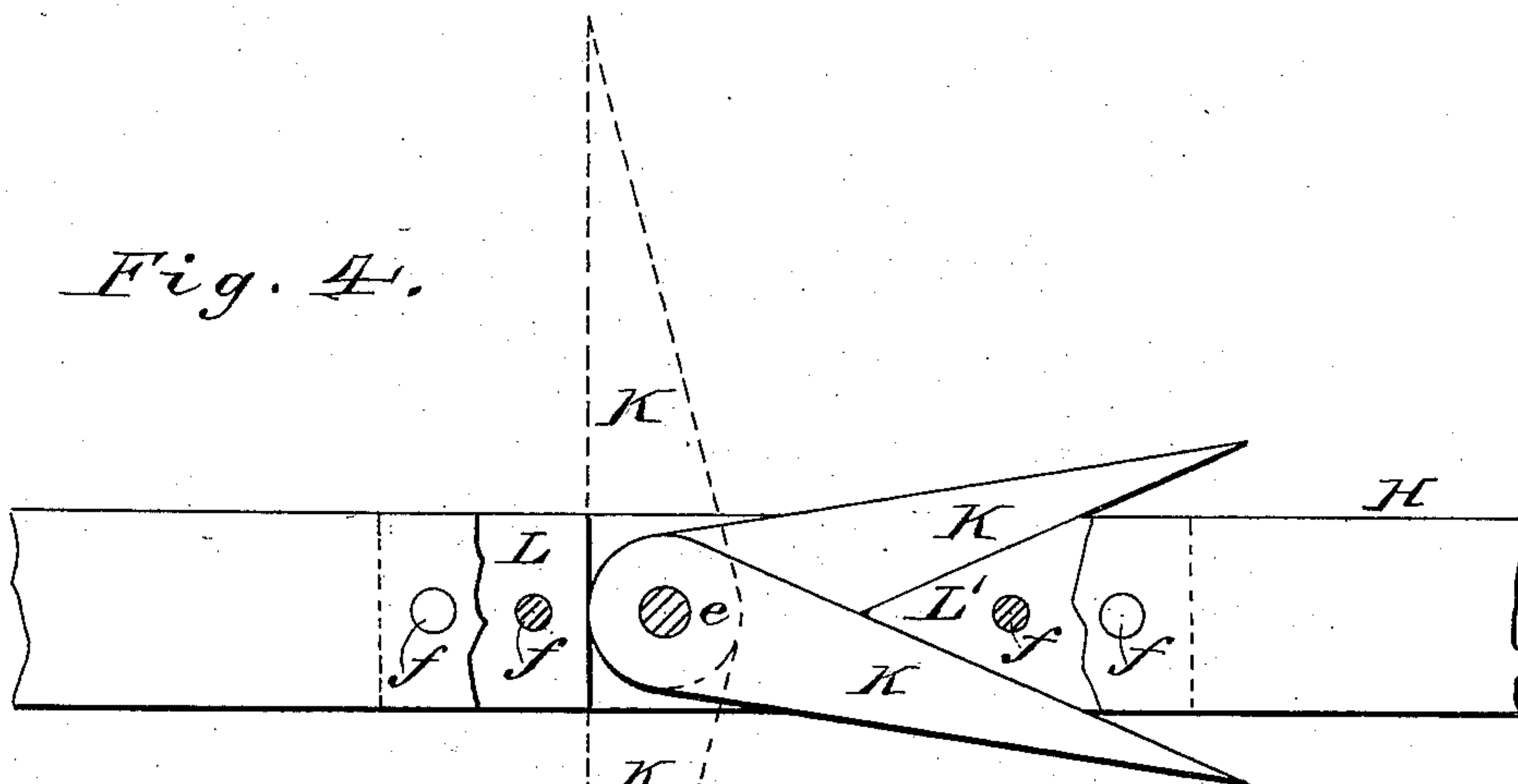
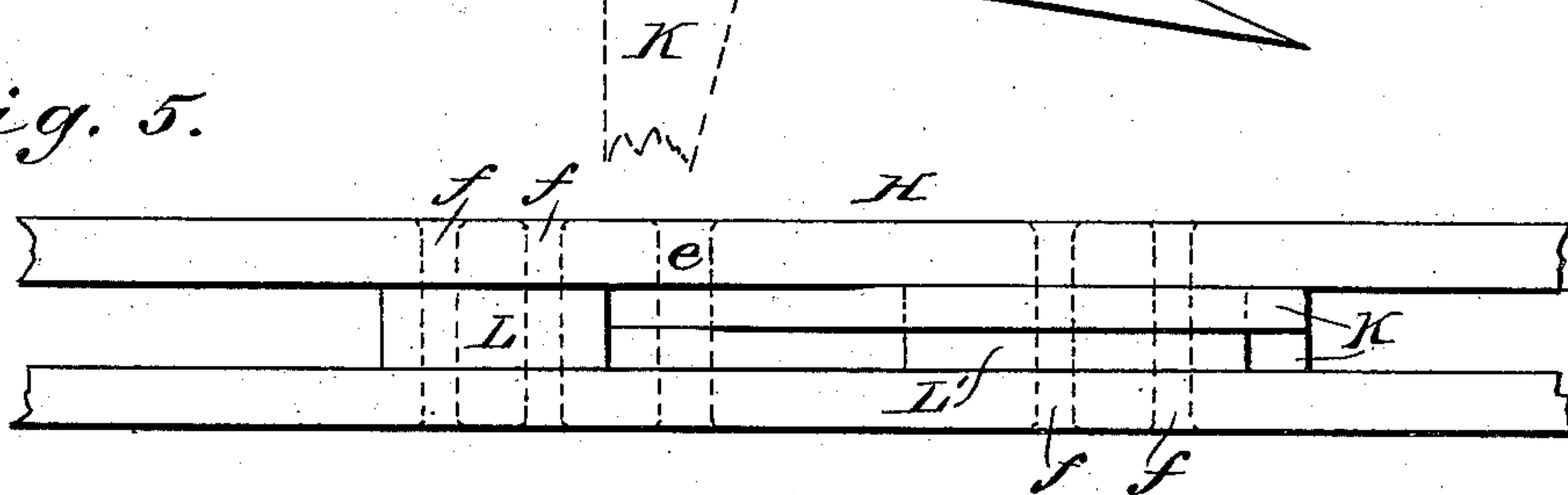


Fig. 5.



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UNITED STATES PATENT OFFICE.

PEDRO SODAL, OF CIENFUEGOS, CUBA, ASSIGNOR TO SODAL, MONTALVO & BOULANGER, OF SAME PLACE.

FURNACE AND APPARATUS FOR BURNING BAGASSE.

SPECIFICATION forming part of Letters Patent No. 375,461, dated December 27, 1887.

Application filed August 4, 1886. Serial No. 209,912. (No model.)

To all whom it may concern:

Be it known that I, PEDRO SODAL, of Cienfuegos, Cuba, have invented new and useful Improvements in Furnaces and Apparatus for Burning Bagasse, &c., of which the following is a full, clear, and exact description.

This invention has for its object the burning of green bagasse, megasse, or cane-trash, and other combustible materials, in a green or moist condition, as fuel in the furnaces of steam-boilers of different kinds, and in sugar-boiling apparatus exposed to the air and heated by the direct application of fire; also in other furnaces and apparatus. It will suffice here, however, by way of illustration, to describe the invention as applied to the burning of green bagasse—that is, the crushed sugar-cane in the condition it comes from the mill—for the purpose of raising or maintaining steam in a steam-boiler; and in applying the invention to the burning of green bagasse, it should here be observed that it not only saves the time, labor, and expense of sun-drying the bagasse, but a much greater amount of heat, by reason of the superior dryness of the material, equal in effect, or nearly so, to that derived from coal, is obtained from the bagasse than when sun-dried, thus making it a cheap and serviceable fuel for the raising of steam, &c.

This invention relates to apparatus operating, in connection with the furnace to which the green bagasse or moist combustible material is to be supplied, as a mechanical drier and feeder or conveyer to the furnace of said bagasse or combustible material, the flame and heat derived from said furnace serving to gradually and effectually dry the green bagasse or moist material during the passage of the latter to the fire box or chamber of the furnace, substantially as hereinafter described; and the invention consists in certain special constructions and combinations of parts in a drier and feeder for such purpose, as hereinafter set forth.

Prior, however, to minutely describing the invention in the form in which it is shown applied in the drawings, it should be remarked that a fire is first built in the furnace of or from any suitable combustible material, in order to get up the necessary flame and heat to dry the green bagasse, &c., at starting; but

this initial heating is only necessary for a short space of time, inasmuch as the fire is afterward kept up by the bagasse, &c., itself, as the same is dried in the course of its feed and passage to the furnace, against or in an opposite course to the flame-heat of the furnace. I would also remark, in advance, that the green bagasse or moist combustible material may be introduced into the flame heat which dries and burns it, either from the top or by the side, in any place from the back of the fire-flue of the furnace to the fire-chamber against the course of draft to the chimney, and be caused to travel through a sufficient length of course in its feed as to be dried and ready for combustion before it reaches the fire box or chamber of the furnace.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 represents a central longitudinal vertical section through a steam-boiler furnace having my invention applied, and showing by full lines a tubular-flue steam-boiler in position for being heated by said furnace. Fig. 2 is a vertical transverse section of the same, upon a larger scale, on the line *xx* in Fig. 1. Fig. 3 is a plan view of the one end portion of the mechanical device used to pass the bagasse, &c., into the furnace. Fig. 4 is a broken plan view, and Fig. 5 a broken side view, upon a still larger scale, of certain details pertaining to my mechanical drier and feeder.

A is the fire-box or combustion-chamber of a steam-boiler furnace, B its grate, and C its ash-pit.

D is the body of the furnace, carrying the steam-boiler E, and constructed to pass the flame and heated gases from the fire-chamber A to the rear of the boiler, and from thence, through flues *b b* in the boiler, to the chimney or chimney-flue F.

Extending in a backward direction from the fire-chamber A to and through the back of the furnace-body D, and below the boiler, in what may be termed the "lower flue-space" of the furnace-body, is a metal bedway or plate, G, constructed or provided with any number of parallel gutters *c c*, extending throughout the length of said plate and serv-

ing to carry, for free or independent rotation upon cross or horizontal axes within them, a series of rollers, *d d*, arranged at suitable distances apart, one in advance of the other. 5 These rollers form bearings or supports for a frame or series of longitudinal bagasse, &c., carriers, *H*, corresponding in number and arrangement to the gutters *c*. These carriers are designed to be reciprocated lengthwise on 10 or over the rollers *d*, and may be moved in concert by a rear connecting-plate, *I*, through any suitable means or power applied to said plate, which plate, that is furnished with running-wheels, also serves to receive the green 15 bagasse, &c., as it is supplied through a feed-opening, *J*, which may be fitted with any suitable door and be provided with a feed-table, from which the green bagasse, &c., may be passed into and down through the opening *J* 20 onto the plate *I*, and from thence onto the carriers *H*.

The carriers *H* are each composed of upper and lower bars connected together at a suitable distance apart and a series of laterally- 25 working pushers or fingers, *K K*, between them. The lower bar of each carrier may slightly enter the gutters *c c* and form the running surfaces for the carriers upon the rollers; but the upper bar and intermediate portion, 30 including the pushers or fingers *K K*, are arranged above the level of said gutters. The carriers *H* and pushers or fingers *K* constitute the reciprocating conveyer, which carries the bagasse into and along the flue-space of the 35 furnace. The fingers *K* are pivoted in pairs at suitable distances apart, as at *e*, along each carrier between the bars composing the latter, and are arranged to open and close from and into opposite sides of the same, subject, as re- 40 gards the extent of their opening or closing movements, to stops *LL'*, here shown as formed by suitably-shaped blocks, secured, by rivets *ff*, between the bars of each carrier. As the conveyer, composed in part of these carriers, 45 is moved forward during its longitudinal reciprocating action, the bagasse or combustible material on it causes the pushers or fingers *K K* to open, as shown in Fig. 3 and by dotted lines in Fig. 4, and as the conveyer moves 50 back said fingers close, as shown by full lines in Fig. 4. In this way, or by these means, the bagasse, &c., is carried over or advanced from

one pair of fingers to another throughout the series during each advance stroke of the conveyer and is fed intermittently along the flame 55 space or flue of the furnace in a direction opposite to that of the passage of the products of combustion in their way to the chimney-flue. This feed of the green bagasse, &c., gradually exposes it to a very high tempera- 60 ture, which will cause the water in it to be evaporated and to pass off in the form of vapor to the chimney, while the bagasse, &c., itself will, by the time it reaches the fire-chamber of the furnace, have become so thoroughly dry 65 as to form a most efficient and economical fuel for keeping up the combustion in the furnace.

Apertures *g* may be provided for relieving the gutters *c* of any obstructing rubbish or dirt that may fall into them from the bagasse, &c. 70 Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a mechanical feeder and drier of moist fuel for furnaces, the within-described longitudinally-reciprocating fuel-conveyer adapted 75 for operation within the furnace and composed of a series of longitudinal carriers arranged side by side at suitable distances apart, and a series of laterally opening and closing pushers 80 or fingers attached to said carriers, substantially as specified.

2. The reciprocating plate *I*, in combination with the carriers *H*, attached to said plate, the laterally opening and closing fingers *K*, piv- 85 oted to said carriers, the plate *G*, having longitudinal gutters *c*, and the rollers *d* within said gutters, substantially as specified.

3. The combination, with the combustion-chamber and with the body of the furnace hav- 90 ing a feed-opening for moist combustible material at a distance from the combustion-chamber, of a reciprocating conveyer provided with opening and closing fingers and adapted to intermittently feed said combustible material 95 through the flame-space of the furnace to or toward the combustion chamber thereof, essentially as described.

Cienfuegos, July 27, 1886.

PEDRO SODAL.

Witnesses:

FELIX DORTICÓS,
FELIX S. ARENAS.